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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,959	02/04/2004	Peter Hampden Clifton	169.12-0610	3842
164	7590	07/22/2005	EXAMINER	
KINNEY & LANGE, P.A. THE KINNEY & LANGE BUILDING 312 SOUTH THIRD STREET MINNEAPOLIS, MN 55415-1002			EASTHOM, KARL D	
			ART UNIT	PAPER NUMBER
			2832	

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No. 10/771,959	Applicant(s) CLIFTON ET AL.	
	Examiner Karl D. Easthom	Art Unit 2832	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 29-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 29-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/4/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

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1. Applicant's election without traverse of Group I, claims 1-17 and 29-38 in the reply filed on 6/6/5 is acknowledged.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Parkin (5,764,567). Parkin discloses the claimed invention at Figs. 6 or 10 with tunnel stack having first and second ferromagnetic layers and tunnel barrier layers as noted. Claim 2 of Parkin discloses that the coupling between the free and pinned layers can be parallel or non-parallel in the absence of an applied field, the antiparallel state being the negative exchange coupling of the claim. Also, at the top of col. 7, it appears that there is negative exchange coupling since there is antiparallel coupling at small negative fields. For claim 7, if $x=0$, then the aluminum oxide at col. 6, lines 20-66 meets the claim. For claim 8, the $\text{Al}_{\text{sub}2}\text{O}_{\text{sub}3}$ is a point on the line, or a point in the range, meeting the claim. For claims 9-10, the layers are as noted above.
4. Claims 1 and 7-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Hasegawa et al. (2003/0035255). Hasegawa et al. discloses the claimed invention at

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Fig. 1 with tunnel stack having first 1 and second ferromagnetic layers 3 and tunnel barrier layer 3. Par. 146 discloses the negative exchange between the fixed 3 and free layers 1. For claim 7, par. 115 discloses the tunnel layer 3 is $\text{Al}_{\text{sub}2}\text{O}_{\text{sub}3}$, meeting the claim with $x=0$, $y=2$ and $z=3$. In claim 8, the line is met by a point on the line which includes the point $\text{Al}_{\text{sub}2}\text{O}_{\text{sub}3}$. That is, the line is a range of points, and a 102 rejection is met when a point in the range is disclosed. In claims 9-10, the free and pinned layers are as noted.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2-3, 5-6, 11-16, 29-35 and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parkin (5,764,567) or Hasegawa (2003/0035255) in view of Carey et al. (6756128). The claimed invention is disclosed as noted above except the material of the tunnel barrier. Carey et al. discloses the tunnel barrier at the abstract and at col. 2, lines 1-60, and col. 4, lines 30-50 in order to lower the resistance which lowers the noise, so that such a tunnel material would have been obvious where it is noted to replace the prior art of AIO such as that of Hasegawa. For claim 2-3, 5-6, 12, 16, and 29-32, the $\text{TiAlO}_{\text{sub}x}\text{N}_{\text{sub}y}$ meets the claims because N is considered the dopant for the titanium alloy oxide. For claims 13, 33, and 37-38, the exchange coupling and free and pinned layers are as noted above in Hasegawa. In claims 14

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and 34, the NiFe ferromagnetic layers of Hasegawa et al. at Examples 1-2 are each below 30A, as are the layers for many of the samples. For claim 15, col. 4, lines 30-40 of Carey et al. discloses thicknesses of 7 A in order to produce a good TMR or signal to noise ratio so that such a thickness would have been obvious.


7. Claims 2-6, 11-17, and 29-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parkin (5,764,567) or Hasegawa (2003/0035255) in view of Chen et al. (6183859). The claimed invention is disclosed as noted above except the tunnel material. Chen discloses an oxidized aluminum layer having titanium and other trace metals such as Ta, or Si at col. 3, lines 35-60, considered dopants meeting claims 2-6, 11-12, 16-17, 29-32, and 36. Chen discloses same to reduce pinholes common in oxidized aluminum for prior art thin barrier layers such as those of Parkin and Hasegawa, see col. 1, lines 55-67, so that such a material would have been obvious to replace the prior art barriers. Such a layer must be thin as noted at the passage to reduce resistance, thus rendering claims 15 and 35 obvious for the same reason, where Chen discloses 25A at the bottom of col. 4, obvious to reduce resistance and thus reduce noise as noted above. The other claimed elements for claims 13-14, 33-34, and 37-38 are in Hasegawa as noted above, and not repeated here.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl D. Easthom whose telephone number is (571) 272-1989. The examiner can normally be reached on M-Th, 5:30AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KDE



KARL D. EASTHOM
PRIMARY EXAMINER